

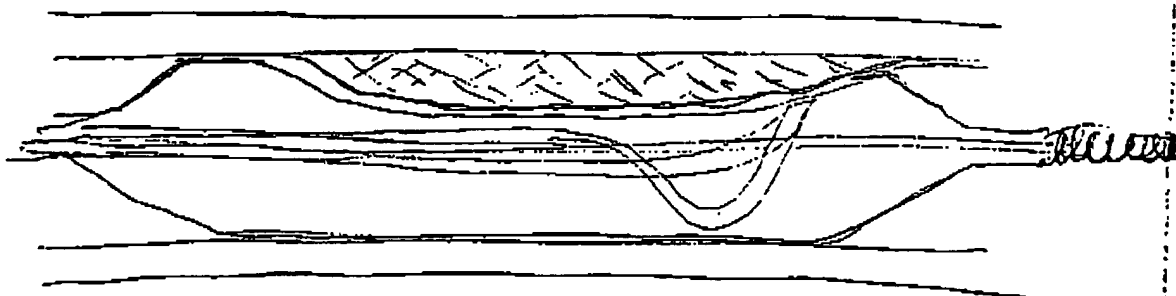
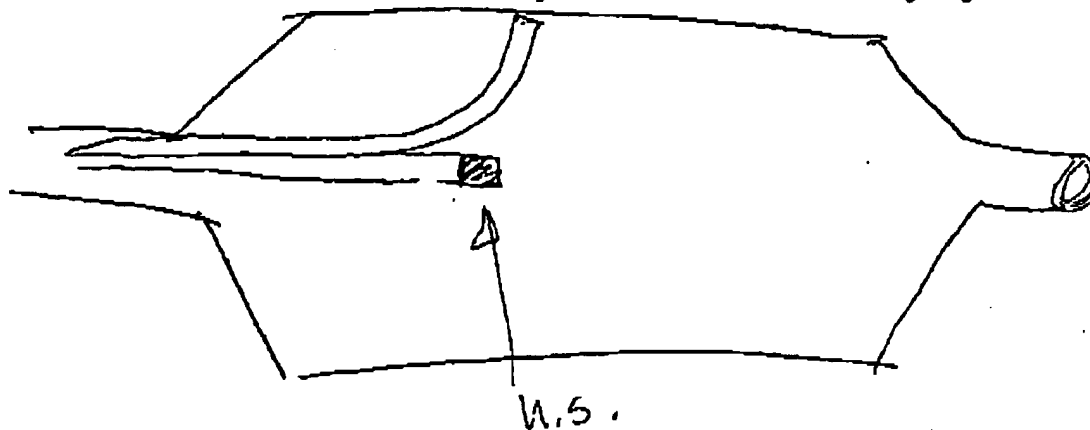
Cryo balloon

= Spot freeze

= IVUS Monitor lesion  
location and freeze

Probe

*D. Lefebvre*



# Key Points to Protect

#1 Inflation of balloon with low pressure gas ( $CO_2$ ), combined with delivery of high pressure oxygen.

1) evaporative cooling  
2) wind chill effect

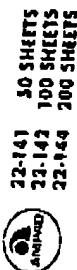
#2 as in #1 except that oxygen may be spot applied or eccentrically applied to create localized cooling (spot freezing within a chamber)

#3 as in #2, but where freezing is guided by visualization including IVUS, OCT, ~~an~~ angiography, or impedance ~~imaging~~ ~~imaging~~

#4 Method of evaporative cooling where as in #1 but that a wind chill effect is created by directing the low pressure gas to aid the evaporative cooling of the high pressure oxygen.

22-141 50 SHEETS  
22-142 100 SHEETS  
22-144 200 SHEETS





#5 Method of cooling with liquid <sup>diffusion</sup> CO<sub>2</sub>, which utilizes a back-pressure closed system, and prevents the formation of dry ice by keeping the pressure above the triple point for CO<sub>2</sub> of 5.1 atm. Cooling is accomplished by the "boiling" of the liquid CO<sub>2</sub>, from 56.5 atm to 5.1 atm, released.

#6 as in #5 where pressure is regulated by an external pressure regulator

#7 as in #5, where release from high pressure to low pressure is accomplished through an orifice

#8 as in #8, where orifice is made of uniform distribution to spray entire inside of cryo chamber

#9 as in #5, where H.P. CO<sub>2</sub> is sprayed to create focal spot cooling as described in #3.